

FIELD NOTES ON VIRGINIA ORTHOPTERA.

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INTRODUCTION.

The notes here recorded cover the period between December, 1913, and the close of 1915. During this time the writer was officially stationed at the field laboratory of his division at Charlottesville, where during the season of 1914 an almost continuous record of the local Orthoptera was kept. At intervals of variable duration the writer was away on field work in other parts of the State, the more important trips being to Norfolk and to Monterey, approximately a month being spent at each place. In 1915 practically the entire season was spent at Tappahannock. At all these places Orthoptera were studied as thoroughly as the time that could be spared for the purpose permitted. Fairly extensive collections were made at each of the localities mentioned. These along with smaller collections from a number of additional localities enable us to form at least a preliminary idea of the distribution of Orthoptera in relation to the different physiographic subdivisions of the State.

These as usually given in standard geographic works are five in number. Beginning at the east is the Coastal Plain, locally known as "Tidewater Virginia." This is limited on the west by the "fall line," beyond which the Piedmont region extends to the Blue Ridge which forms the third province. Then follows the Shenandoah or Valley of Virginia, the most fertile province of the State. West of this comes the succession of bold ridges and elevated intermontane valleys constituting the Appalachian Mountain province.

In central and southern Virginia each of these provinces presents certain peculiarities of physiography which apparently markedly influence the character of the respective floras and faunas. The greatest contrast is shown between the mountain section along the western border and the lower lands to the east. In the mountain section, as exemplified in Highland and Bath counties, we have the long, roughly parallel ridges and intermontane valleys typical of Appalachian country, with an elevation of from 1,500 to 4,500 feet.

Its fauna and flora are, on the whole, of a northern type, the dominant forms being those which are characteristic of southern New England or northern Pennsylvania. The Blue Ridge also shows some traces of northern influence, but its lower altitude (1,500-2,500 feet) and wide separation from the main Appalachian mass makes its fauna and flora less distinctive, many austral forms extending into it from the adjoining Piedmont. Observations in the Shenandoah Valley have been too meager to enable the writer to make any final assertions, but all signs indicate the transitional character of its biota. In the Piedmont region as shown at least in the latitude of Charlottesville two sections can be distinguished. That bordering the Blue Ridge, which we may speak of as the Upper Piedmont, is considerably more rugged and diversified than the section farther east, which is nearly flat or at most gently rolling. In general the line of the Chesapeake & Ohio Railroad between Gordonsville and Orange marks the boundary between these two sections. In the upper section the fauna and flora are predominantly austral in character, but there is also a considerable infusion of northern elements. The lower section has so far been but little studied by the writer, but the vegetation at least shows an influx of certain Coastal Plain elements which apparently do not occur in the upper section. Thus in the region immediately east of Gordonsville occur such trees as sweet gum (*Liquidambar styraciflua*) and willow oak (*Quercus phellos*) which do not appear to exist in the more rugged country about Charlottesville. Farther east the line of demarkation between the Piedmont and Coastal Plain is clearly indicated only along the large rivers where the usual falls occur, but elsewhere the transition from the one to the other is gradual. This is a decided contrast to the abrupt passage between the two in the Pennsylvania-New Jersey region where the fall-line marks a decided break in both topography and biota. In Virginia no such break occurs, the typical Coastal Plain elements spreading inland to a varying extent, some, such as the loblolly pine (*Pinus taeda*) and the holly (*Ilex opaca*) extending only a dozen or so miles west of the fall line, others, like the sweet gum and willow oak, to the western limit of the lower Piedmont, while such trees as the Spanish oak (*Quercus falcata*) and persimmon (*Diospyros virginiana*) spread clear across the entire Piedmont to the base of the Blue Ridge.

In Virginia the Coastal Plain presents certain well-marked contrasts to the same province as represented farther north in New Jersey. In general, it may be said that the soil, although prevailingly sandy, is of a decidedly finer texture than the New Jersey sands and is consequently more suitable for cultivation. In Virginia nothing comparable to the New Jersey pine barrens has so far been observed, the country on the whole having much the same appearance as the

Delaware Valley district of that State.¹ South of the James River the Coastal Plain, appears to be largely a flat, or at most, gently rolling, featureless expanse, but north of that river in the narrow peninsulas between the estuaries of the York, Rappahannock, and Potomac rivers there is some quite rugged topography in places where the small streams have cut deep ravines in the upland. Bordering all the large rivers in the Coastal Plain are wide, level terraces marking an earlier stage of flood-plain deposition [Columbian formation]. The boundary between these "flats" and the higher interior is formed by a well-defined line of bluffs.

With regard to its Orthopteran fauna there appears to be in Virginia two primary centers of dispersal, one of which is typically represented by the Appalachian Province, the other by the Coastal Plain. The Appalachian Province is the center of an assemblage of decided northern affinities, certain members of which tend to spread eastward into the Piedmont region and, to a less degree, into the Coastal Plain. The latter province forms the center of a southern or Austral fauna, similar in its essential features to the Coastal² fauna of New Jersey, which in Virginia spreads in large measure over the entire Piedmont region and to a certain degree penetrates the Blue Ridge and lower mountain levels.

Typical of the Appalachian Province, in Virginia appear to be the following:

Orphulella speciosa.
Chloealetis conspersa.
Chorthippus curtipennis.
Encoptolophus sordidus.
Camnula pellucida.
Pardalophora apiculata.
Spharagemon saxatile.
Dendrotettix australis.
Melanoplus celatus.
Melanoplus devius.
Melanoplus gracilis.

Melanoplus walshii.
*Melanoplus femur-rubrum.*³
Melanoplus confusus.
Melanoplus luridus.
Melanoplus bivittatus.
Scudderia pistillata.
Amblycorypha rotundifolia.
Neoconocephalus ensiger.
*Conocephalus brevipennis.*³
Atlanticus davisi.

Other forms occurring commonly in the mountains, but of approximately equal frequency and uniformity throughout the State are *Arphia sulphurea*, *Chortophaga viridifasciata*, *Spharagemon bolli*, *Dissosteira carolina*, *Scudderia texensis*, *Scudderia furcata*, *Orchelimum vulgare*, *Conocephalus fasciatus* (apparently more uniformly

¹ See Stone, Plants of Southern New Jersey, Annual Report, N. J. State Museum, Trenton, N. J., 1910.

² See Fox, Data on the Orthopteran Faunistics of Eastern Pennsylvania and Southern New Jersey, Proc. Acad. Nat. Sci., Phila., 1914, pp. 457-463.

³ Both *M. femur-rubrum* and *C. brevipennis* occur throughout the State, but in the writer's experience they are much more abundant and generally distributed in the mountain section than in the Piedmont region and Coastal Plain where they are usually quite local in distribution, though quite common in favorable situations. The writer wishes it understood that he does not mean to imply that the forms listed above are necessarily Appalachian in origin, merely that, as conditions are at present, the species have their stronghold in the region in question.

distributed in the Coastal Plain), *Conocephalus strictus* (?) and *Nemebius fasciatus*.

Species having their stronghold in the Coastal Plain appear to be the following:

Doru aculeatum.
Stagmomantis carolina.
Truxalis brevicornis.
Mermeria intertexta.
Syrbula admirabilis.
Amblytropidia occidentalis.
Orphulella pelidna.
Orphulella olivacea.
Clinocephalus elegans.
Dichromorpha viridis.
Arphia xanthoptera (?).
Pardalophora phoenicoptera.
Hippiscus rugosus.
Psinidia fencustralis.
Trimerotropis citrina.
Trimerotropis maritima.
Leptysma marginicollis.
Schistocerca serialis.
Schistocerca damnifica.
Schistocerca alutacea.
Schistocerca obscura.
Melanoplus scudderi.
Melanoplus atlantis.
Melanoplus keeleri.
Paroxya clavuliger.
Scudderia cuneata.

Amblycorypha floridana carinata.
Amblycorypha uhleri.
Neoconocephalus exiliscanorus.
Neoconocephalus lyristes.
Neoconocephalus melanorhinus.
Neoconocephalus robustus.
Neoconocephalus palustris.
Neoconocephalus retusus.
Neoconocephalus triops.
Orchelimum agile.
Orchelimum glaberrimum.
Orchelimum laticauda.
Orchelimum concinnum.
Orchelimum minor.
Orchelimum fidicinum.
Orchelimum superbum.
Conocephalus stictomerus.
Conocephalus nigropleurooides.
Conocephalus spartinae.
Conocephalus saltans.
Atlanticus americanus.
Anurogryllus muticus.
Anaxipha exigua.
Apithes agitator.
Orocharis saltator.

At Charlottesville in the upper Piedmont country the following Appalachian forms have been taken:

Orphulella speciosa.
Pardalophora apiculata.
Melanoplus femur-rubrum.
Melanoplus confusus.

Melanoplus luridus.
Melanoplus bivittatus.
Conocephalus brevipennis.

At the same locality the following Austral types have been obtained.

Syrbula admirabilis.
Orphulella pelidna.
Dichromorpha viridis.
Arphia xanthoptera.
Pardalophora phoenicoptera.
Hippiscus rugosus.
Schistocerca serialis.
Schistocerca damnifica.
Schistocerca alutacea.
Melanoplus scudderi.

Melanoplus atlantis.
Paroxya clavuliger.
Amblycorypha floridana carinata.
Amblycorypha uhleri.
Neoconocephalus robustus.
Neoconocephalus retusus.
Neoconocephalus triops.
Orchelimum agile.
Conocephalus saltans.
Anurogryllus muticus.

It is evident from these lists that the affinities of the Charlottesville region are fundamentally Austral, but that intermixed with the Aus-

tral types is a small number of Appalachian forms. Of the latter the only representatives that are at all common are spring or early summer species, such as *Melanoplus confusus* and *Pardalophora apiculata*, or widely distributed forms, which, nevertheless appear to have their stronghold in the Appalachian region, such as *Melanoplus femur-rubrum*.

The Blue Ridge has not been sufficiently studied to enable us to form an adequate idea of its Orthopteran fauna, but so far the following Appalachian species have been obtained at the two localities visited:

Orphulella speciosa.
Chloealtis conspersa.
Pardalophora apiculata.
Spharagemon saxatile.
Melanoplus celatus.

Melanoplus confusus.
Melanoplus bivittatus.
Melanoplus luridus.
Amblycorypha rotundifolia.

With these are associated the following Austral forms:

Dichromorpha viridis.
Pardalophora phoenicoptera.
Hippiscus rugosus.

Melanoplus atlantis.
Paroxya clavuliger.

The localities in the State where collections or observations were made include the following:

COASTAL PLAIN.

Norfolk, Portsmouth, Churchland, Gilmerton, and Deep Creek, Norfolk County, and Deanes, Nansemond County, August 8–10, September 15 to October 8, 1914; April 17–19, May 31, July 11, 1915. Altitude 10 to 20 feet. Country a nearly flat plain intersected by numerous tidal inlets and "branches." Soils prevailingly sands or sandy loams of fine texture.

Virginia Beach, Princess Anne County, August 9, September 20, 1914. Altitude, 20 feet. A typical beach of coarse beach sand, back of which are low dunes bordered on the landward side by higher, rolling fixed dunes occupied by loblolly pine and other trees, these merging into the ordinary inland region.

Cape Henry, Princess Anne County, September 20, 27, 1914. Altitude, 50 feet. Region essentially like the preceding, but with higher sand dunes.

Franklin, Southampton County, September 18, November 5, 1914. Altitude, about 60 feet. Topography flat to gently rolling. Soils sandy loams of fine texture.

Tappahannock, Essex County, November 9–12, 1914; April 20 to May 4, May 26 to October 24, 1915. Altitude, about 50 feet. Topography consisting of nearly flat plains bordering river (Columbia formation) and level to locally rugged uplands. Soils variable, but usually sandy and of fine texture, frequently silty; rarely coarse or gravelly.

Center Cross, Essex County, August 18, 1915. Altitude, about 100 feet. Topography level to gently rolling, similar to the upland country surrounding the preceding locality.

Dunnsville, Essex County, April 24, August 18, October 3, 1915. Similar to the preceding.

Ware's Wharf, Essex County, October 3, 1915. Altitude, below 50 feet. Low, flat terrace lands bordering river.

Mt. Landing, Essex County, April 28, 1915. Altitude, about 150 feet. Similar to region about Center Cross.

Lloyds, Essex County, April 28, 1915. Altitude, about 150 feet. Similar to the preceding.

Naylor's, Richmond County, September 17, 1915. Low, sandy flats and marshes bordering river (Columbia formation).¹

Sharps, Richmond County, November 13-14, 1914; May 4-26, June 21-23, October 13-15, 1915. Altitude from below 50 feet to about 150 feet. Broad, nearly level plain adjoining river (Columbia formation), with higher level to slightly rolling uplands, with occasional steep slopes close to streams, from 4 to 6 miles back from river. Soils fine-textured, varying from light sandy loams to stiff silty clays.

Urbanna, Middlesex County, August 18, 1915. Altitude, about 100 feet. Level to slightly hilly upland. Soils fine sandy loams.

Millenbeck, Lancaster County, August 8, September 27, 1915. Altitude below 50 feet. Sandy and marshy beach and flat sandy terrace-plains.

Ottoman, Lancaster County, August 8, September 27, 1915. Altitude below 50 feet. Topography, flat. Soils fine sands to stiff silty clays.

Irvington, Lancaster County, September 26, 1915. Altitude below 50 feet. Topography, flat or very gently rolling. Soils fine sandy loams.

Whitestone, Lancaster County, September 26, 1915. Altitude below 50 feet. Sandy beach and salt marshes along river; elevated level terrace elsewhere.

Newtown, King and Queen County, August 17, 1915. Altitude about 150 feet. Topography undulating. Soils mostly fine sandy loams.

PIEDMONT REGION.

Fredericksburg, Spotsylvania County, September 5, 1915. Altitude, 150 to 200 feet. Topography rolling to hilly. Soils, so far as observed, sandy loams.

Warrenton, Fauquier County, June 8, 1914. Altitude, 400 to 600 feet. Topography, gently rolling. Soils not studied, but apparently sandy loams predominate.

¹ See Fredericksburg Folio, U. S. Geol. Survey.

Louisa, Louisa County, October 26, 1914. Altitude, 500 feet. Topography, gently rolling. Soils consisting of sandy loams and stiff red clays.

Bells Cross Roads, Louisa County, October 26, 1914. Altitude, 500 feet. Topography gently undulating, with moderately steep slopes near the streams. Soil mostly sandy loams with stiff, red clay subsoil.

Republican Grove, Halifax County, November 2, 1914. Altitude, about 500 feet. Topography, flat to gently rolling. Soil, a sandy loam, underlaid by stiff, buff-colored subsoil.

Charlottesville, Albemarle County, December 1, 1913, to August 14, 1914, September 9–14, October 9 to November 1, November 15, 1914, to April 15, 1915; October 27 to December 1, 1915. Altitude, 300 to 800 feet. Topography varied, but as a rule fairly rugged, with steep slopes near streams, but with more or less extensive level or slightly rolling interstream areas. Soils, sandy loams and stiff red clays.

Carter's Mountain, Albemarle County, February 22, October 31, 1915. Altitude, 800 to 1,300 feet, a prominent ridge of Catoctin schist, 2 miles southeast of Charlottesville. Soil a mellow, reddish clay (Porters clay).

Crozet, Albemarle County, August 1, 1914. Altitude, 700 feet. Topography rolling.

BLUE RIDGE.

Rock Fish Gap, near Afton, Albemarle County, May 30, 1914. Altitude, about 2,000 feet. Topography steep and rugged. Soil, a mellow, brown loam, more or less stony.

Jarman's Gap, Albemarle County, 4 or 5 miles west of Crozet. July 30 to August 1, 1914. Altitude, 2,500 feet. Topography and soils similar to preceding.

SHENANDOAH VALLEY.

Front Royal, Warren County, June 9, 1914. Altitude, 500 to 600 feet. Surface, a gently rolling upland with steep slopes close to the streams.

Woodstock, Shenandoah County, June 10, 1914. Altitude, 800 to 900 feet. Topography, gently rolling. Soil, a rich clay loam (Hagerstown series).

Dale Enterprise, Rockingham County, June 11, 1914. Altitude, 1,300 to 1,400 feet. Topography, rolling to hilly. Soil, a rich, clay loam.

Fishersville, Augusta County, June 12, 1914. Altitude, 1,400 feet. Topography, rolling to hilly. Soil, a rich clay loam, stony on steeper slopes.

APPALACHIAN PROVINCE.

Bells Valley, Rockbridge County, April 15, 1915. Altitude, 1,600 feet. Topography, rolling; a valley bordered on each side by high mountain ridges. Soil, a rich clay loam, more or less stony.

Hot Springs, Bath County, September 5-7, 1914. Altitude, 2,300 to 3,500 feet. Topography of usual Appalachian type with rolling intermontane valley and steep mountain ridges. Soil, a clay loam, stony on mountains.

Bolar, Highland County, August 15 to September 3, 1914. Altitude, 2,200 to 2,500 feet. Topography rugged; a narrow intermontane valley and steep mountain ridges, with rather wide alluvial flats along stream. Soils, loamy, stony on slopes.

Trimble, Highland County, August 15 to September 2, 1914. Altitude, 2,600 feet. Narrow stream valley with border meadows and steep mountain ridges. Soils, loamy.

Meadowdale, Highland County, August 19, 1914. Altitude, 2,800 to 3,000 feet. A narrow intermontane valley, bordered by steep mountain ridges. Soils, mostly rich clay loams.

Monterey, Highland County, August 15 to September 4, 1914. Altitude, 2,800 to 4,000 feet. Topography of typical Appalachian type consisting of intermontane valley bordered on each side by mountain ridges. Soil, a rich, mellow clay loam in valley; a thin, stiff rocky clay on steeper slopes.

Sounding Knob, Highland County, September 1, 1914. Altitude, 4,500 feet. A prominent peak, 6 miles south of Monterey.

SYSTEMATIC LIST OF SPECIES.

Family FORFICULIDAE.

DORU ACULEATUM (Scudder).

Tappahannock, July 28 to September 10, 11 males, 6 females. Evidently frequent on tall reeds, *Spartina cynosuroides*, in tidal marshes, occasionally spreading to nearby timothy pastures (August 21, 1 male, 1 female). Active only at night.

Family BLATTIDAE.

ISCHNOPTERA, species.

A fair number of roaches of this genus were obtained at Charlottesville and Tappahannock. They are at present in the care of Mr. Morgan Hebard, who is engaged in a revision of the genus.

CRYPTOCERCUS PUNCTULATUS Scudder.¹

Hot Springs, September 7, 1 male; Monterey, between August 20 and September 1, 1 male.

¹ I am indebted to Mr. Rehn for this determination.

Family MANTIDAE.

STAGMOMANTIS CAROLINA (Johannsen).

Tappahannock, September 6 to 19, 3 males, 3 females; Naylor's, September 17, 1 male. Apparently a denizen of marshes, showing a preference for areas of tall reeds, *Spartina cynosuroides*, but also occurring in grassy (*Homalocenchrus oryzoides*, *Sagitteria*, etc.) inland bogs and occasionally straying to thickets on the adjoining dry land.

Family ACRIDIIDAE.

Subfamily TETTIGINAE.

ACRYDIUM (TETTIX) ARENOSUM ANGUSTUM (Hancock).¹

Tappahannock, April 22–30, 3 males, 4 females.

Charlottesville, March 28, April 12–22, May 1, 25, 31, June 15, July 4, 1914. Locally frequent, showing a marked preference for patches of bare, damp earth, occurring in open woodland and in open, grassy pastures.

Jarman's Gap, August 1, 1914, 1 female.

NEOTETTIX FEMORATUS (Scudder) [=N. bolivari Hancock].²

Tappahannock, September 9, 1 male.

Charlottesville, May 18, 1 male, June 27, 1 female, 28, 1 male, July 3–17, 1 male, 3 females. Occasional, preferring areas of damp or relatively firm ground, either bare or covered with short grasses, in pastures and stream bottoms.

TETTIGIDEA LATERALIS (Say)

Virginia Beach, September 20, 1 female. Occasional in open grove of pine (*P. taeda*) and sweet gum on fixed dunes; Tappahannock, April 23, 1 female.

Charlottesville, April 12, 17, 19, 22, May 19, 31, June 17, 20, 25, July 4, 8, 11, 17, September 10, 1914. Common, but somewhat local, having the same general habitat preferences as the other tettigids, occurring in both woodland and campestral locations.

Monterey, September 1, 1914, 1 male. (Dry, open woods on mountain slope.)

Subfamily TRUXALINAE.

TRUXALIS BREVICORNIS (Johannsen).

Churchland, September 16, 2 males (in thick growth of goose grass, *Eleusine indica* in low, sandy field adjoining "branch"). Tappahannock, August 2, 2 males, 1 female juv., August 10 1 female juv.,

¹ Typical specimens determined by Mr. Hebard.

² Determinations by Mr. Hebard.

August 12, 1 male, August 13 to September 19. Frequent in tidal marshes, occurring especially in growths of *Scirpus americanus* and to a less extent in *Spartina cynosuroides*, also occurring in grassy inland bog and in vegetation bordering mill pond; Naylor's, September 17, 2 females (occasional in *Scirpus americanus* patches of tidal marsh); Wares Wharf, October 3, 1 female (tidal marsh in zone occupied by *Spartina cynosuroides* and *Baccharis halimifolia*); Whitestone, September 26, 2 males, 1 female (in patch of cat-tails).

Fredericksburg, September 5, 1 female (low damp spot, corner of woods, in area occupied by ironweed, boneset, and associated vegetation).

MERMIRIA INTERTEXTA Scudder.¹

Portsmouth, October 3, 2 males, 1 female (in bunch grasses (*Andropogon*, *Sorghastrum*), of open oak and sweet gum scrub bordering tidal marshes); Millenbeck, August 8, September 27 (several in thick grass (*Spartina patens*) and bushes (*Iva oraria*), bordering patch of tall *Spartina glabra* on shore of estuary); Whitestone, September 26, 2 females (edge of salt marsh, in zone of *Spartina glabra*, *Distichlis spicata*, and *Baccharis*).

SYRBULA ADMIRABILIS (Uhler).

Norfolk, July 11, juv.; Churchland, August 8-9, adults and juv., September 15; July 11, 1915, juv. only; Deanes, September 26; Gilmer-ton, October 1, November 6; Deep Creek, October 1; Franklin, September 18, November 5; Tappahannock, June 4 to July 18, nymphs only; July 25 to August 2, adults and nymphs; August 13 to October 11; Wares Wharf, October 3, 1 female; Center Cross, August 18; Sharps, June 22, juv., October 13, 1 female; Urbanna, August 18; Ottoman, August 8, September 27; Irvington, September 26, 1 female; Newtown, August 17.

Fredericksburg, September 5; Charlottesville, May 23 to July 22, nymphs only, July 31 to August 12, adults and nymphs, September 10 to October 16, 1914; October 30, 1915.

A frequent and widely distributed species in old, neglected fields and pastures, especially those overgrown with *Andropogon* and other coarse and dry grasses, less commonly found in open woodland scrub. Apparently of equal frequency throughout the Piedmont and Coastal Plain provinces.

ERITETTIX SIMPLEX (Scudder) [=E. carinatus of authors].

Tappahannock, April 24-29, June 4-8, September 19 to October 11 (nymphs); Mount Landing, April 28; Lloyds, April 28; Dunnsville,

¹ Determined by comparison with material in collection of the Academy of Natural Sciences of Philadelphia. The species called *vigilans* in my paper on New Jersey Orthoptera (Proc. Acad. Nat. Sci., Phila., vol. 66, 1914, p. 487) is the same, *vigilans* now being recognized, according to Rehn (verbal communication) as a synonym of *intertexta*.

April 24; Center Cross, August 18 (nymphs); Sharps, May 5–18, June 22; Ottoman, September 27 (nymphs); Irvington, September 26 (nymphs).

Bells Cross Roads, October 26 (nymphs); Charlottesville, December 5, 1913 (nymphs), March 23 to April 17 (nymphs), April 19–26 (adult males, nymphs), May 1 (adult male, female, and nymphs), May 9 to June 25, June 27–28 (adults and recently hatched young), July 3 to November 26, 1914 (nymphs), February 21 to April 4 (nymphs), April 6–8 (adult male, nymphs), October 27 to November 20, 1915 (nymphs).

Bells Valley, April 15, 1915 (1 juv.).

Frequent in old, neglected fields and pastures, especially those over run with *Andropogon* and other coarse grasses, in the Piedmont region and part of the Coastal Plain, but not yet taken in the southeastern portion of the State. Nothing definite can be said regarding its westward range in the State since collections from the Appalachian region are lacking for the season when the species is most common, except for the single immature example taken in Bells Valley as noted above.

In Virginia this species occurs in two forms. One of these, representing the typical race, is characterized by the possession of a pair of supplementary carinae on the disk of the pronotum between the median and lateral carinae, and by the presence of a pair of longitudinal black lines bordering the lateral carinae on their inner sides. The other or atypical race (see Rehn and Hebard, Proc. Acad. Nat. Sci., Phila., vol. 62, 1911, pp. 626–627) lacks both of these features, but has instead a unicolorous pronotal disk and a broad bar of brown on the sides of the pronotum below the lateral carinae. Both forms are frequent at Charlottesville and in the Rappahannock River valley, the typical form being the more abundant, though the atypical form is by no means scarce. Both have the same habitat preferences and life histories, and are almost invariably associated with each other. Although typical examples of both races are common, the writer has never found any individuals bridging the gap between them. If such intergradations exist they are apparently very exceptional.

AMBLYTROPIA OCCIDENTALIS (Saussure).

Deanes, September 26, 1 male, 1 juv.; Gilmerton, November 7, 1 female.

Known only from the extreme southeastern portion of the State, where it appears to be very scarce. Those taken by the writer were found in the low grassy undergrowth of open woodlands of oak, loblolly pine, and sweet gum.

ORPHULELLA SPECIOSA (Seudder).

Charlottesville, July 1-31, 6 males, 9 females (infrequent, local).

Jarman's Gap, July 30, August 1, 3 males, 1 female.

Monterey, August 17 to September 1 (common); Hot Springs, September 6-7 (occasional).

This species was quite common in the drier, closely-grazed pastures and open mountain slopes about Monterey; at Hot Springs it appeared to be much less frequent, though more extended search might have shown it more abundant. At Charlottesville, it appeared to be rather scarce, occurring in noticeably smaller numbers than its congener, *O. pelidna*, with which it was usually found associated in dry upland and hillside pastures.

ORPHULELLA PELIDNA (Burmeister).

Norfolk, September 17, 1914, July 11, 1915; Portsmouth, October 3; Churchland, August 8-9, September 15-16, November 4, 1914, July 11, 1915; Deanes, September 26; Gilmerton, October 1, November 6; Deep Creek, October 1; Virginia Beach, August 9, September 20; Cape Henry, September 27; Franklin, September 18, November 5; Tappahannock, June 4-20 (nymphs), June 30-October 24; Center Cross, August 18; Urbanna, August 18; Naylor's, September 17; Sharps, June 22 (adults and nymphs), October 13; Ottoman, August 8, September 27; Irvington, September 26; Newtown, August 17.

Fredericksburg, September 5, Charlottesville, June 13-15 (nymphs) June 27 (1 male, nymphs), July 8 (6 males, 4 females, 1 juv.); July 11 to August 12, 1914.

One of the most common and widely distributed species of the Coastal Plain, extending into the Piedmont as far, at least, as Charlottesville, where it is rather frequent, although of somewhat local occurrence. Its usual preference is for open fields and pastures overrun with *Andropogon* and other dry grasses, but is also not uncommon in the grassy and herbaceous undergrowth of open woodlands and in the low grassy tracts adjoining tidal marshes.

ORPHULELLA OLIVACEA Morse.

Wares Wharf, October 3, 1 female (tidal marsh, zone of *Spartina patens*, *Iva oraria*, etc.), 1 male 1 female (marshy river shore, in *Spartina glabra*); Naylor's, September 17, 1 female (tidal marsh, in *Scirpus americanus*); Millenbeck, August 8, September 27 (frequent in *Spartina glabra* and border fringe of *S. patens* on marshy shore of estuary); Whitestone, September 26 (common in salt marsh).

This being a strictly maritime species is naturally confined to tide-water Virginia. It is evidently common in suitable situations in the lowest part of the Rappahannock River where the water has a fairly high salt content and where the typical salt marsh grass, *Spartina*

glabra, is abundant, but farther up the basin, as in the vicinity of Tappahannock, where the water is only slightly brackish, and the tidal marshes occupied mostly by *Scirpus americanus* to the almost total exclusion of *Spartina glabra*, it apparently becomes quite scarce.

CLINOCEPHALUS ELEGANS Morse.

Norfolk, September 17, 1914, July 11, 1915 (nymphs); Portsmouth, October 3; Cape Henry, September 20; Tappahannock, July 25 to October 11; Wares Wharf, October 3; Naylor's, September 17; Sharps, October 13.

This species, in spite of its usual occurrence within the range of tidal influence, is not a true maritime form. Its favorite haunts are the low damp or marshy tracts forming the border zones of tidal marshes where fresh water prevails, and where the species shows a marked preference for the somewhat restricted areas occupied by *Distichlis spicata*, but also occurs in somewhat smaller numbers in the more extensive areas of *Scirpus americanus* and *Spartina patens* and much less frequently in the tall reeds, *Spartina cynosuroides*. In true salt marsh—namely, that occupied by *S. glabra*—it does not normally occur. Occasionally it is taken in inland localities; thus, at Tappahannock two adult females were observed in a grassy, freshwater bog fully 4 miles from the river. The dominant growth in this bog consisted of *Homalocenchrus oryzoides*, with which were intermixed numerous plants of *Sagittaria* and *Pontederia*.

DICHROMORPHA VIRIDIS (Scudder).

Franklin, September 18 (very local, apparently not common); Tappahannock, June 30 (nymphs), July 18 to October 11 (of frequent occurrence, though somewhat sporadic); Naylor's, September 17 (occasional); Sharps, October 13 (apparently local); Irvington, September 26, (1 female).

Fredericksburg, September 5 (1 male); Charlottesville, June 25–28 (nymphs), July 3 (male, nymphs), July 8–22 (male, female, nymphs), July 27 to October 31, 1914 (frequent, but rather sporadic).

Jarmans Gap, July 30 (several adults).

This species appears to be very local in southeastern Virginia; in other portions of the Coastal Plain and Piedmont region visited by the writer it was of very regular though somewhat sporadic occurrence. Its haunts in this region are somewhat varied, but are usually in damp spots or, if in dry situations, in places where excessive evaporation is prevented by a tolerably thick cover of vegetation. As noted by Morse, it is intermediate in its habitats between campestral and sylvan types. In open country the writer has observed it in such situations as areas of tender grass in shallow gulleys; in damp depressions harboring such plants as *Juncus effusus*, alder bushes,

ironweeds and their usual associates; in closely grazed grassy pastures on stiff soil; in dense clumps of *Andropogon* on dry, but compact soils; grassy meadows bordering streams; and grassy tracts bordering fresh and tidal marshes, but, in the case of the latter, it apparently never occurs in areas lying within the direct influence of the tides. In no case has the writer ever found this species associated with *Clinoccephalus* in the *Distichlis spicata* areas, though occurring only a few yards away in the dark green, tender grasses and sedges occupying the ditches and other humid tracts of the adjoining forelands. In open woodland the species has been regularly taken in wet or damp grassy spots and not infrequently also in relatively dry, shrubby undergrowth. In general, the writer's observations indicate that the young are largely, if not entirely, restricted to moist or somewhat damp situations, and that the adults tend to spread from these into the dryer locations.

CHLOEALTIS CONSPERSA Harris.

Jarmans Gap, August 1, 2-2 males, 6 females.

Hot Springs, September 5-6, 2 males, 1 female; Bolar, September 3, 1 male, 1 female; Monterey, August 18-September 1 (sporadic, not infrequent).

Observations so far made indicate that this species is confined to the mountainous regions of the State.¹ All species were taken in situations typical of the species, namely, in open deciduous woodlands, where they occurred in grassy or shrubby undergrowth, in both moist and dry stations. One example from Bolar, however, was taken on a road crossing the wide, nearly level meadows of the Jackson River Valley.

CHORTHIPPUS (= STENOBOTHRUS) CURTIPENNIS (Harris).

Bolar, August 15, September 3; Meadowdale, August 19; Monterey, August 16 to September 1.

The writer found this one of the commonest grasshoppers in the high, intermontane valleys of Highland County. It is evidently confined to the mountain districts. Its favorite haunts are the open moist depressions and ditches overgrown with dense, succulent grasses and other herbage (ironweed, boneset, joe-pye weed, *Juncus effusus*, smartweed); from these it spreads in considerable numbers to the neighboring meadows, pastures, and mountain slopes, but rarely, if ever, invades wooded tracts.

Subfamily OEDIPODINAE.

ARPHIA SULPHUREA (Fabricius).

Churchland, July 11, 2 males; Franklin, September 18 (nymph); Tappahannock, April 25 (adult male, juv.), April 29 to July 25; Lloyds, April 28 (2 males, 1 juv.); Sharps, May 18-23, June 22.

¹ Mr. Rehn informs me it has been taken at Arlington.

Charlottesville, March 23 to April 19 (nymphs), April 26 to May 3 (male, juv.), May 17 to July 3, September 10 to October 31, 1914 (nymphs), February 21, 1915 (nymphs).

Rock Fish Pass (Afton), May 30; Jarman's Gap, July 30, 1 female, August 1, 1 male, 1 female.

Woodstock, June 10; Fishersville, June 12.

Monterey, August 22, 1 female.

Occasional, or at most sporadically frequent, in *Andropogon* and other coarse grasses of dry, untilled areas in or near woodland, rarely in open pastures of tender grass. Apparently uniformly frequent throughout the State, the data on this point from the mountain section being, however, inconclusive as yet owing to the lateness of the season at which observations were made, when only the last few survivors of this species were to be found.

ARPHIA XANTHOPTERA (Burmeister).

Portsmouth, October 3; Churchland, September 15 to October 1, November 4; Deanes, September 26; Gilmerton, October 1, November 6; Deep Creek, October 1; Virginia Beach, September 20; Franklin, September 18, November 5; Tappahannock, July 25 (juv.), August 2-21 (adult male and juv.), September 9 to October 11; Wares Wharf, October 3; Naylor's, September 17.

Fredericksburg, September 5; Charlottesville, June 25 to July 8 (juv.), July 31 to October 31, 1914.

Monterey, August 31, 1 female; Trimble, September 2, 1 female; Hot Springs, September 6-7.

Moderately frequent in most localities visited, but apparently quite scarce in Highland County, and even somewhat local in the Rappahannock River section of tidewater Virginia where it was not observed in a number of localities—a fact that indicates, as borne out by continuous observations at Charlottesville, Tappahannock, and Norfolk, the sporadic occurrence of the species in contrast to the general distribution of such common forms as *Melanoplus atlantis*, *Orphulella pelidna*, etc.

In a general way *xanthoptera* shows greater latitude in its choice of habitats than *sulphurea*. Both are dry land forms and flourish only in untilled areas, but *xanthoptera* does not show any marked preferences for woodland associations, occurring as frequently in campestral stations as in sylvan. In open country it usually occurs in old waste fields and pastures overrun with coarse grasses and weeds, and the grassy tangles bordering cultivated fields; in woodland surroundings it frequents the low, briery scrub and coarse herbage of clearings and borders.

CHORTOPHAGA VIRIDIFASCIATA (De Geer).

Norfolk, September 17, 1914 (adults and juv.), April 19 (adults, male and female, frequent), July 11, 1915 (male, still soft); Churchland, August 8-9, September 15 to October 3, November 4 (nymphs), 1914, April 17 (1 female, 1 juv.), May 31 (1 female), 1915; Deanes, September 26; Gilmerton, November 6 (juv.); Virginia Beach, September 20; Franklin, September 18 (adults and nymphs); Tappahannock, April 20 to July 1, July 18 to October 24 (adults and nymphs); Mount Landing, April 28; Lloyds, April 28; Dunnsville, April 24; Center Cross, August 18; Urbanna, August 18; Sharps, November 13 (nymphs), 1914, May 5-23, June 22, 1915; Ottoman, August 8; Irvington, September 26 (nymphs).

Fredericksburg, September 5 (adults and nymphs); Warrenton, June 8; Bells Cross Roads, October 26 (adult male, nymphs); Republican Grove, November 2; Charlottesville, December 5, 1913 (nymphs); March 23 to April 10 (nymphs), April 12 to May 9 (adults and nymphs), May 17 to June 20, June 25 to November 26 (adults and nymphs), 1914, February 15 to April 1 (nymphs); April 4-8 (adults, male and nymphs), October 27 to November 25 (adults and nymphs), 1915.

Jarman's Gap, July 30, August 1 (adults and nymphs); Rock Fish Pass (Afton), May 30.

Front Royal, June 9; Woodstock, June 10; Dale Enterprise, June 11; Fishersville, June 12.

Bells Valley, April 15 (adult males, and nymphs); Monterey, August 16 to September 1 (adults and nymphs); Meadowdale, August 19 (nymphs); Hot Springs, September 6-7 (nymphs).

This is the most generally and uniformly distributed grasshopper of the State, so far as collections from the localities listed enable one to judge. In numerical strength its only superiors are the dominant species of *Melanoplus*, namely, *M. atlantis* in the Coastal Plain and Piedmont sections and *M. femur-rubrum* in the Appalachians. It occurs in a great variety of habitats, but shows a stronger predilection for campestral stations than for sylvan surroundings. It is common in cultivated fields (wheat plats, clover, and timothy pastures, etc.) as well as old waste lots and pastures.

The winter is passed in the nymph stage. At Charlottesville the earliest adult males were found April 4 (1915), the earliest females April 12 (1914). The eggs laid by the spring brood of adults begin to hatch toward the end of June (June 25, 1914) and adults of the second brood first appear by the middle (July 11, Norfolk) or end (July 20, Charlottesville) of July. Adults of this brood continue to develop during the remainder of the summer and early autumn, and survive until the beginning of winter. It is possible that the earliest maturing individuals of second generation may lay eggs from which hatch the smaller of the winter-surviving nymphs, but this point needs experimental verification before it can be accepted as a fact.

ENCOPTOLOPHUS SORDIDUS (Burmeister).

Monterey, August 17 to September 1, 1914; Meadowdale, August 19, 1914; Hot Springs, September 7, 1914.

One of the most abundant grasshoppers in the drier timothy and blue-grass pastures of the high, intermontane valleys and mountain slopes of Highland and Bath Counties. The writer has not taken it outside of the mountains, but Morse¹ records it from Roanoke and Rehn informs me that it occurs as far east as Fredericksburg.

CAMNULA PELLUCIDA (Scudder).

Monterey, 4,000 feet on Sounding Knob, September 1, 1 male.

This is the first record of the occurrence of this common northern species south of northern Pennsylvania. The specimen was taken close to an open oak grove at the edge of a closely grazed sheep pasture.²

PARDALOPHORA APICULATA (Harris).³

Charlottesville, March 23 (nymph), April 12 to April 19 (male adults and nymphs), April 22 to May 1 (male and female adults and nymphs), May 11 to June 28, July 14 to November 26 (nymphs), 1914, February 22 to April 8 (nymphs), November 25 (nymph), 1915.

Rock Fish Gap (Afton), May 30.

Woodstock, June 10; Fishersville, June 12.

Bells Valley, April 15, 1 male.

Monterey, August 17 (1 nymph).

Not infrequent at Charlottesville in old pastures and woodland clearings overrun with *Andropogon* and the other dry herbage. It will doubtless prove to be of frequent occurrence in similar situations throughout the mountain and valley sections, but so far the data from these sections are incomplete.

PARDALOPHORA PHOENICOPTERA (Burmeister).

Tappahannock, June 4 to August 2 (adults), October 24 (nymphs); Dunnsville, April 24 (nymphs), Mount Landing, April 28 (nymphs); Lloyds, April 28 (nymphs); Sharps, May 15 (nymph), June 22.

Charlottesville, December 5, 1913 (nymphs), March 23 to May 18 (nymphs), May 25 to June 2 (male adults, nymphs), June 4 to July 21, October 21 to October 31 (nymphs), 1914, February 22 to April 8 (nymphs), 1915.

Jarman Gap, July 30, August 1, 1 male, 1 female.

Occasional to frequent, but more or less sporadic, in *Andropogon* and other coarse grasses in old fields, pastures, and woodland clearings.

¹ Publ. No. 18, Carnegie Institution of Washington, 1904, p. 34.

² Specific determination confirmed by Mr. Rehn.

³ = *Hippiscus tuberculatus* of most authors (see Rehn and Hebard, Proc. Acad. Nat. Sci., Phila., vol. 62, 1910, p. 630, footnote). Both this and the next species have usually been included in the genus *Hippiscus*.

The eggs of this species hatch in early autumn; the young survive the winter and attain maturity late in the spring. Adults disappear by the end of July or the beginning of August.

HIPPISCUS RUGOSUS (Scudder).

Norfolk, September 17, 1914, July 11 (nymphs), 1915; Deanes, September 26; Franklin, September 18; Tappahannock, July 18 (male adults and nymphs), July 25–October 9; Center Cross, August 18; Urbanna, August 18; Sharps, June 22, (nymphs); Ottoman, August 8, September 27; Irvington, September 26.

Charlottesville, June 13 to July 3 (nymphs), July 8–17 (male adults, nymphs), July 20–31 (male and female adults and nymphs), August 11 to October 16, 1914, October 31, 1915.

Jarman Gap, July 30, 1 male.

Bolar, September 3, 1 female; Hot Springs, September 6–7.

Common, at least locally, in dry, open, untilled grass lands, especially those dominated by *Andropogon* and other coarse grasses, but not infrequent in such succulent grasses as timothy. Not observed in the higher Appalachian districts of Highland County, but rather frequent in a weedy field at Hot Springs. Its center of distribution appears to include the Coastal Plain and Piedmont region, but it spreads from there far up into the nearby mountain areas.

SPHARAGEMON BOLLI (Scudder.)

Portsmouth, October 3; Churchland, August 8–9; Deanes, September 26; Virginia Beach, September 20; Franklin, September 18; Tappahannock, July 1 (nymphs), July 23 to September 22; Irvington, September 26, 1 male.

Charlottesville, May 25 to June 20 (nymphs), June 28 (2 males, 1 female, nymphs), July 3 to October 10, 1914.

Jarman Gap, July 30, August 1.

Monterey, August 17–31; Hot Springs, September 5–6.

Usually common in suitable stations in the mountains; apparently less frequent or more sporadic in the Piedmont and Coastal Plain sections. Occurs normally in areas of coarse grass or scrub in or about wooded tracts.

SPHARAGEMON SAXATILE PLANUM Morse.

Jarman Gap, August 1.

Monterey, August 17–22.

Appears to be fairly common in suitable stations in the mountainous sections. At Jarman Gap it occurred in considerable numbers in a closely grazed grassy pasture on the summit of the ridge, while at Monterey it was common on the higher and steeper slopes, on cleared but untilled rocky ground close to the margin of the woods, frequenting bare, thinly grassed (*Danthonia*), or briery areas. In all places it was associated with the preceding species.¹

¹ Mr. Rehn kindly verified my determination of this form.

SPHARAGEMON COLLARE WYOMINGIANUM (Thomas).

Tappahannock, July 23, 1 female (wheat stubble field), July 25, 1 male.

Small area of coarse sand bordering woods, vegetation open and scanty, consisting of short, coarse grasses and other dry herbage.

Apparently very rare in tidewater Virginia.

DISSOSTEIRA CAROLINA (Linnaeus).

Portsmouth, October 3; Churchland, August 8–9, September 15 to October 7; November 4, 1914, July 11, 1915; Deanes, September 26, Franklin, September 18, November 5; Tappahannock, November 9–12, 1914, June 1 (nymphs), June 24 to October 24, 1915; Naylor's, September 17; Sharps, October 13; Ottoman, August 8, September 27.

Fredericksburg, September 5; Bells Cross Roads, October 26; Republican Grove, November 2; Charlottesville, June 13–15 (nymphs), June 17–25 (male adults, nymphs), June 26 to July 3 (male and female adults, nymphs), July 4 to October 31, 1914, October 27 to November 26, 1915.

Jarman Gap, July 30, August 1.

Monterey, August 16–31; Meadowdale, August 19; Trimble, August 15; Bolar, August 15; Hot Springs, September 5–7.

Common throughout, possibly rather more abundant in the mountain sections than in the Coastal Plain and Piedmont. Frequents bare or nearly bare areas of compact earth, occurring on highways, well-trodden paths, cultivated fields, and less frequently in dry grasslands; avoids to some extent areas of coarse or loose sand, apparently preferring silty, loamy, or clayey soils.

PSINIDIA FENESTRALIS (Serville).

Churchland, August 8, 1 male; Virginia Beach, August 9, September 20; Cape Henry, September 27; Tappahannock, July 25 to October 11; Naylor's, September 17; Sharps, June 22 (nymphs), October 13; Millenbeck, August 8.

Of regular occurrence on sand dunes of ocean beaches and the sandy beaches of tidal estuaries, usually associated in such situations with the sand bur, *Cenchrus*; occasionally found a short distance inland in sandy fields or on barren areas of coarse sand.

TRIMEROTROPIS CITRINA Scudder.

Churchland, August 8, September 15 to October 1, November 4–5, 1914, July 11 (male), 1915; Deanes, September 26; Gilmerton, October 1; Deep Creek, October 1; Franklin, September 18, November 5; Tappahannock, August 25 (1 male); Wares' wharf, October 3 (1 female); Sharps, November 14, 1914 (1 male, 1 female); Millenbeck, August 8 (1 male, 1 female), September 27 (1 male).

In the Rappahannock River section all specimens were found on the sandy beaches of broad, tidal estuaries, where this species is usually associated with *Psinidia*, and, like the latter, in areas characterized by the presence of sand bur, *Cenchrus*. In southeastern Virginia it appeared to be of frequent, though somewhat local, occurrence inland, inhabiting there open sandy fields and footpaths. Appears to avoid locations where there is any considerable cover of vegetation.

TRIMEROTROPIS MARITIMA (Harris).

Virginia Beach, August 9 (adults, nymphs), September 20; Cape Henry, September 20, 27; Naylor's, September 17, 1 male; White-stone, September 26, 1 male, 1 female.

Frequent on sand dunes of sea beaches, commonly associated with *Ammophila arenaria*; occasionally occurring on sandy shores of tidal estuaries. At Naylor's the single specimen taken occurred in an area supporting *Cenchrus*.

Subfamily ACRIDIINAE.

LEPTYSMA MARGINICOLLIS (Serville).

Portsmouth, October 3; Churchland, November 4 (1 female); Deep Creek, October 1; Cape Henry, September 20, 27 (13 adults, 1 nymph); Tappahannock, April 24 (1 female in *Andropogon*), 25 (1 male in *Andropogon*), July 18 (1 male), August 2 (juv.), 12 (juv.), 13 (male adult, nymphs), 18–October 11; Naylor's, September 17; Sharps, October 13; Millenbeck, September 27; Irvington, September 26.

Common locally in tidal marshes, where it occurs most frequently in the areas of *Scirpus americanus*, largely avoiding the true salt marsh grass, *Spartina glabra*; not uncommon in grassy or cattail bogs inland at the head of tidal streams or in the grassy thickets bordering sluggish streams (Deep Creek) not far from the coast. Occasionally spreading from the marshes to dry upland fields, where examples have been taken in *Andropogon*. So far the species has been observed in the latter only in spring and late fall. It is evident from the records given that the adults or nymphs survive the winter.

SCHISTOCERCA SERIALIS (Thunberg). [*S. americana* of authors].

Portsmouth, October 3; Churchland, August 8–9 (adults, nymphs), September 15 (adults and nymphs), 16 to October 1, November 4, 1914, July 11 (1 male), 1915; Deanes, September 26 (adults, nymphs); Gilmerton, October 1, November 6; Deep Creek, October 1; Cape Henry, September 20; Franklin, September 18, November 5; Tappahannock, April 20–29, June 7 to July 1, July 23 (nymphs), August 21 (adults, nymphs), September 9 to October 11; Naylor's, September 17; Ottoman, September 27.

Fredericksburg, September 5; Bells Cross Roads, October 26 (1 male); Republican Grove, November 2; Charlottesville, April 19 to June 15, June 16 to August 12 (adults, nymphs),¹ September 10 to October 31, 1914, October 31, 1915.

Dale Enterprise, June 11 (1 female).

Common in Coastal Plain localities and quite frequent, at least locally, in the Piedmont. Widely distributed in open country, but shows a marked preference for areas covered with tall herbage (wheat fields, timothy pastures, taller clumps of *Andropogon*, roadside thickets, etc.).

SCHISTOCERCA DAMNIFICA (Sauss).

Portsmouth, October 3; Churchland, September 16, November 4, 1914, April 17, 1915; Deanes, September 26; Gilmerton, October 1, November 6; Virginia Beach, September 20; Franklin, September 18, November 5; Tappahannock, April 24 to July 18, September 9 (adults, nymphs), September 19 to October 24; Mount Landing, April 28; Lloyds, April 28; Sharps, May 18; Ottoman, September 27; Irvington, September 26.

Charlottesville, April 2 to June 20, September 10–October 10, 1914; April 4–8, October 31, 1915.

Frequent in Coastal Plain and Piedmont region, occurring chiefly in *Andropogon* and coarse herbage generally, usually in or near wooded areas.

SCHISTOCERCA ALUTACEA (Harris) (Typical race).²

Portsmouth, October 3; Deanes, September 26; Naylor's, September 17.

Only a few examples taken, apparently quite scarce. Mostly found in bushy thickets (*Baccharis halimifolia*, *Ira oraria*) and tall grasses in low grounds bordering tidal marshes; at Deanes' taken in bracken (*Pteridium aquilinum*) scrub in low woods.

SCHISTOCERCA ALUTACEA (rubiginosa phase).

Churchland, September 23 (1 female); Tappahannock, July 25 (1 male), August 21 (1 female).

Charlottesville, July 11 (1 male), July 14 (2 males) August 11 (1 male). Hot Springs, September 5 (1 male).

Apparently quite scarce and local. Most examples were taken in areas of bunch grass (*Andropogon*) or in associated thickets. At Hot

¹ Nymphs taken July 3 were reared to adults in confinement.

² This is the phase with the continuous, median dorsal stripe. The unstriped, russet-brown form, known as *rubiginosa*, is regarded as only a color phase of *alutacea* by Rehn. On the beaches is a relatively large form closely resembling *rubiginosa*. In my article on New Jersey Orthoptera, p. 508, following a verbal suggestion by Rehn, I mentioned that the latter might be a unicolorous phase of *S. obscura*, but since the publication of that article Rehn has informed me that such is not the case. I shall accordingly refer to this form as a maritime race of *alutacea*.

Springs it occurred in scrubby undergrowth of open oak-hickory-chestnut woods of steep mountain side.

SCHISTOCERCA ALUTACEA (Maritime race).

Virginia Beach, September 20; Cape Henry, September 20.

In both localities the species was found in small numbers in wax-myrtle (*Myrica*) scrub on the sand dunes.

SCHISTOCERCA OBSCURA (Fabricius).

Churchland, September 15 (1 female), 23 (1 female), October 1 (1 female); Tappahannock, August 26 (1 female), September 6 (1 male), 13 (1 female), 26 (1 female), October 2 (1 male), 11 (1 female); Whitestone, September 26 (2 females).

This striking species appears to occur most regularly in the reedy areas of tidal marshes, having been observed on *Scirpus americanus*, *Spartina cynosuroides*, and *Typha* (cat-tails); it also occurs in the dense herbage clothing the adjoining slopes of the dry land and doubtless not infrequently wanders a considerable distance from water, specimens having been taken at Churchland in a thick growth of goose grass (*Eleusine indica*) on cultivated land and in roadside thickets.

DENDROTETTIX AUSTRALIS (Morse).¹

Monterey (Sounding Knob), September 1, 1914, 1 female, 4,000 feet.

The specimen was taken on stony ground in the shrubby undergrowth of low open woods on the mountain side.

MELANOPLUS SCUDDERI (Uhler).

Churchland, September 16, November 4; Deanes, September 26; Virginia Beach, September 20; Franklin, September 18; Tappahannock, August 21-October 24; Naylor's, September 17; Sharps, October 13; Ottoman, September 27; Irvington, September 26.

Louisa, October 26; Republican Grove, November 2; Charlottesville, December 5, 1913 (2 males, 1 female), September 10 to October 31, 1914, October 27 to November 20, 1915.

Frequent in the Piedmont and Coastal Plain localities. Occurs typically in dry, grassy tangles and undergrowth in or close to wooded areas, occasionally spreading to open, grassy and weedy fields.

MELANOPLUS CELATUS Morse.²

Jarman Gap, July 30, 1 female.

Monterey, August 20-30; Hot Springs, September 6-7.

¹ *Podisma australis* Morse. Mr. Rehn assures me that the species is actually a *Dendrotettix*, a view in which, I understand, Morse now concurs. My specimen was carefully compared with Morse's type by Mr. Hebard, who informed me there was practically no question of its being the same species.

² I am indebted to Morgan Hebard for the specific determination. He informs me the specimens are not entirely typical, the cerci being "very broad distad."

Evidently confined to the mountain sections. As noted by Morse it is a sylvan species. It appears to be very sporadic in distribution; in restricted areas it may occur in considerable numbers, as in two or three spots near Monterey, but in most places it is lacking or very scarce. All specimens were taken in or close to open, deciduous woods on mountain slopes, in grassy (*Danthonia* sp. undet.) or shrubby (ferns, oak saplings, etc.) undergrowth.

MELANOPLUS DEVIUS Morse.¹

Bolar, September 3, 1 male, 1 female.

Taken in grassy undergrowth of an open grove of sugar maple on level tract bordering a mountain stream.

MELANOPLUS GRACILIS (Bruner).²

Monterey, August 22.

Found in fair numbers in an open marsh overgrown with rank herbage (iron-weed, *Eupatorium purpureum*, sneezeweed (*Helenium*, species ?), monkshood (*Aconitum*), sedges (*Carex*), painted cup, etc.) on the outer edge of the timothy meadows bordering the stream draining the intermontane valley.

MELANOPLUS WALSHII Scudder.³

Monterey, August 23, 1 male; Hot Springs, September 6.

Frequent locally at Hot Springs in the grassy and shrubby undergrowth (blueberries, bracken, etc.) of dry, open deciduous woods on higher slopes of mountain ridges. Apparently rare in similar situations at Monterey.

MELANOPLUS ATLANIS (Riley).

Churchland, August 8-9, September 15-October 6, November 4-6, 1914, May 31 (male and female adults, nymphs), July 11, 1915; Deanes, September 26; Gilmerton, October 1, November 6; Deep Creek, October 1; Franklin, September 18, November 5; Tappahannock, November 12, 1914, June 1 to October 24, 1915; Wares Wharf, October 3; Sharps, November 13, 1914, June 22, October 13, 1915; Urbanna, August 18; Ottoman, September 27; Irvington, September 26.

Fredricksburg, September 3; Warrenton, June 8; Bells Cross Roads, October 26; Republican Grove, November 2; Charlottesville, December 5, 1913 (5 males, 3 females), June 2-November 26, 1914, October 27-November 25, 1915.

Jarman Gap, July 30, August 1.

Front Royal, June 9; Woodstock, June 10; Fishersville, June 12. Monterey, August 18, 1 male; Hot Springs, September 6, 1 male.

¹ Determination by Morgan Hebard.

² Determination confirmed by Rehn and Hebard.

³ = *M. amplexens* Scudder = *M. blatchleyi* Scudder.

Abundant, the dominant grasshopper east of the mountains, but apparently quite scarce in the higher Appalachians. Occurs nearly everywhere in open country, but shows a strong tendency to congregate in farm lands on sandy soils, where it frequently swarms in the grassy fields, fence borders, old stubble fields, timothy and clover pastures, and areas of crab and Bermuda grasses. In the *Andropogon* areas of old neglected fields and pastures it also occurs, but usually in much smaller numbers than in the tenderer grasses of the cultivated districts.

Observations at Charlottesville and Tappahannock indicate the occurrence of two breeds of this species during a single season. From the spring brood of nymphs, adults appear about June 1 and continue in large number until the middle or end of July, when a decided decline in numbers takes place. About the middle of August an increase is noticeable. That a new generation is maturing at this time is indicated by the finding of soft bodied adults which had evidently just completed the final molt. These adults continue to increase and in early autumn they are even more abundant than in early summer. Mating was observed as late as early October. It is doubtless this second brood of adults that lays the eggs tiding the species over winter.

MELANOPLUS FEMUR-RUBRUM (De Geer).

Norfolk, September 17; Portsmouth, October 3; Churchland, September 15, November 4; Deanes, September 26; Gilmerton, October 1; Deep Creek, October 1; Virginia Beach, September 20; Cape Henry, September 20, 27; Franklin, September 18, November 5; Tappahannock, August 21 to October 11; Wares Wharf, October 3; Naylor's, September 17; Sharps, October 13; Millenbeck, September 27; Ottoman, September 27.

Fredericksburg, September 5; Louisa, October 26; Charlottesville, December 5, 1913 (1 male, 5 females), September 10 to October 31, 1914, October 31 to November 25, 1915.

Monterey, August 16 to September 1; Meadowdale, August 19; Trimble, August 15, September 2; Bolar, August 15, September 3; Hot Springs, September 5-7.

The dominant grasshopper of the Appalachian province, abounding everywhere in the timothy and bluegrass pastures of the intermontane valleys and on the open, grassy slopes of the mountains, less frequent in open woodland or clearings. In the Piedmont region and Coastal Plain this species is much less conspicuous than *atlantis* and is largely limited to more humid situations, such as marsh borders, drainage ditches, gulleys, open "branches," and other places where the vegetation is of a moisture-loving type. It is evidently more exacting than *atlantis* in its moisture requirements.

MELANOPLUS CONFUSUS (Scudder) [= *M. minor* of authors].

Tappahannock, May 25 (1 female), June 8 (2 males 1 female) (rare or very local).

Charlottesville, May 18–23 (male), May 25 to July 21 (abundant, somewhat local).

Rock Fish Gap (Afton), May 30, (abundant), Jarman Gap, August 1 (abundant).

Monterey, August 17, 31 (occasional).

At Charlottesville this was the dominant grasshopper during late May and early June, although rather strictly limited to the higher, drier areas and not occurring in any considerable numbers on farm lands. Its choice appears to be for old upland fields and pastures overrun with coarse grasses (*Andropogon*, *Danthonia*, etc.).

MELANOPLUS LURIDUS (Dodge).

Charlottesville, June 20 to July 14 (nymphs probably this species), September 15 to October 10, 1914, October 31, 1915 (local, apparently not common).

Jarman Gap, July 30, August 1, (local, moderately frequent).

Monterey, August 17 to September 1; Hot Springs, September 5–6.

The stronghold of this species appears to be in the Appalachian region, where it was found in abundance along the margins of the woods and in clearings on the mountain slopes. It is a typical sylvan species, frequenting the grassy and shrubby undergrowth of dry woodlands..

MELANOPLUS KEELERI (Thomas).

Portsmouth, October 3; Deanes, September 26; Gilmerton, October 1, November 1; Deep Creek, October 1; Virginia Beach, September 20; Cape Henry, September 20, 27; Tappahannock, September 9 (2 males), 19 (3 males); Irvington, September 26, (1 male).

This is probably a geographic race of the preceding species. It appears to be rather sporadic in its distribution; usually it is scarce or, at most, moderately frequent, but at Virginia Beach and Cape Henry it was found to be fairly common. In its habitat preferences it resembles *luridus*, occurring typically in the grasses and low shrubbery of dry, open woodland.

MELANOPLUS BIVITATTUS (Say).

Jarman Gap, July 30, (1 male).

This specimen had the bright yellow tibiae of the typical form.

MELANOPLUS BIVITATTUS FEMORATUS (Burmeister).

Tappahannock, June 7 (juv.), 17–September 12, Newtown, August 17 (1 female); Irvington, September 26 (1 female).

Charlottesville, June 13 to July 31.

Jarman Gap, August 1.

Monterey, August 22.

Locally frequent, especially in low, moist places overgrown with dense grassy tangles and other herbage; less frequent in timothy pastures and in mixed thickets of brambles and *Andropogon*. The species is best represented in midsummer and becomes scarce toward fall, when usually only females are encountered.

PAROXYA CLAVULIGER (Serville).¹

Portsmouth, October 3; Churchland, August 8-9, November 4; Deanes, September 26; Gilmerton, October 1; Cape Henry, September 20; Franklin, September 18, November 5; Tappahannock, July 18 to October 24; Naylors, September 17; Sharps, October 13; Ottoman, August 8; Irvington, September 26.

Charlottesville, July 11 (adults and nymphs), July 28, August 11. Jarman Gap, August 1, (3 males, 1 female, 1 nymph).

Abundant in the tidal marshes of the Coastal Plain, frequenting the dense growths of *Scirpus americanus* and *Spartina cynosuroides*, but not present in true salt marsh dominated by *Spartina glabra*. It also occurs inland in bogs and wet meadows overgrown with cat-tails, dense grasses, and other rank herbage. At Jarman Gap in the Blue Ridge the species was found in a small boggy spot near the head of a stream quite close to the summit.

Family TETTIGONIIDAE.

SCUDDERIA TEXENSIS Saussure and Pictet.

Portsmouth, October 3; Churchland, September 15; Tappahannock, July 25 to October 11; Sharps, October 3.

Charlottesville, July 17.

Bolar, September 3.

Not very evenly distributed; frequent in some places, scarce in others. Prefers areas of tall grasses (*Andropogon*) and bushes in open fields, pastures, and meadows; also noticed on tall reeds (*Spartina cynosuroides*) in tidal marshes.

SCUDDERIA PISTILLATA Brunner.

Monterey, August 22 (1 male, 1 female); Bolar, September 3 (1 male).²

At Monterey the species was found in briars and low shrubbery on dry, stony mountain slopes close to the woods covering the summit, where it was associated with *S. furcata*; at Bolar in the tall herbage of an old meadow in the intermontane valley. This is, I believe, the most southern authentic record of this species.

¹ = *P. floridiana* (Thomas) of authors, which Rehn and Hebard inform me is a synonym of *clavuliger*.

² Determination confirmed by Rehn and Hebard, who examined my specimens.

SCUDDERIA CURVICAUDA (De Geer).

Tappahannock, July 9 (1 male).

Charlottesville, July 13–14 (1 male, 1 female).

The few examples taken were obtained in bushes and briery thickets in the vicinity of woodland.

SCUDDERIA FURCATA Brunner.

Churchland, September 15; Deanes, September 26; Gilmerton, October 1; Deep Creek, October 1; Virginia Beach, September 20; Franklin, September 18; Tappahannock, September 9 to October 24; Sharps, October 13; Irvington, September 26.

Charlottesville, October 10, 1914; October 31, 1915.

Jarman Gap, July 30 (nymph).

Monterey, August 20–31; Hot Springs, September 6.

The most abundant representative of the genus, common and evenly distributed throughout, but largely restricted to sylvan stations, occurring in trees, bushes, and tall grasses in or close to woodland.

SCUDDERIA CUNEATA Morse.

Norfolk region, exact locality not specified, September 18 to October 1 (2 males); Tappahannock, August 9 (1 male).

At Tappahannock the single male taken was found in an *Andropogen* thicket close to the margin of the woods. It was associated with numerous examples of *furcata*.

AMBLYCORYPHA OBLONGIFOLIA (De Geer).

Tappahannock, July 9 (1 male).

Charlottesville, July 10–27.

Moderately frequent in thickets and shrubbery, usually in the neighborhood of woodland.

AMBLYCORYPHA FLORIDANA CARINATA Rehn and Hebard.

Churchland, September 23 (1 female); Gilmerton, October 1 (1 female).

Tappahannock, July 9 to August 13 (7 males, 2 females).

Charlottesville, July 11 (1 male), July 17 (1 male).

Inhabits similar situations as the last species. More frequent than *oblongifolia* in tidewater Virginia.

AMBLYCORYPHA UHLERI Stål.

Churchland, October 8 (1 female); Franklin, September 18 (1 female); Tappahannock, July 31 to October 2, common in late summer, scarce in fall; Ottoman, September 27.

Charlottesville, August 11, 1914 (1 male), September 3, 1915 (2 males, species frequent).

Occurs chiefly in open country, frequenting the trees, bushes, weeds, and tall grasses of fields, pastures, and roadsides. Apparently the most abundant representative of the genus in the Piedmont and tidewater sections.

AMBLYCORYPHA ROTUNDIFOLIA (Scudder).

Jarman Gap, July 30, August 1 (1 male, 1 female).

Monterey, August 16-22 (2 males, 2 females); Bolar, September 3 (1 female).

Taken in shrubbery and undergrowth in or close to open deciduous woods. Apparently confined to the mountain sections of the State.

MICROCENTRUM ¹ LAURIFOLIUM (Linnaeus).

Whitestone, September 26 (1 male); Tappahannock, September 12 (1 male).

MICROCENTRUM RETINERVE (Burmeister).

Charlottesville, October 31, 1915 (1 adult).

NEOCONOCEPHALUS ² EXILISCANORUS (Davis).

Tappahannock, August 9 to September 10 (12 males).

Frequent for a short period in tidal marshes (not salt), occurring most commonly in tall reeds, *Spartina cynosuroides*, but spreading in small numbers to the adjoining dry land (briery thickets, corn fields).

NEOCONOCEPHALUS LYRISTES (Rehn and Hebard).

Tappahannock, August 12 to September 13 (9 males, 1 female).

Occasional in tidal marshes; taken most frequently on *Spartina cynosuroides*, less frequently on *Scirpus americanus*. Closely resembles the preceding species, but is distinctly slenderer and has an entirely different song.

NEOCONOCEPHALUS MELANORHINUS (Rehn and Hebard).

Churchland, August 8-9 (2 males).

The writer unfortunately failed to note the exact spot at which his specimens were taken, but it was doubtless in a salt marsh bordering a narrow tidal stream. According to Rehn and Hebard the species is confined to true salt marsh (*Spartina glabra* formation).

NEOCONOCEPHALUS ENSIGER (Harris).

Monterey, August 16 (6 males).

This northern species was found frequenting the taller grasses along a narrow ditch in a timothy pasture at the foot of a mountain ridge.

¹ In this genus the specific terms are used in the sense employed in Blatchley's *Orthoptera of Indiana*.

² The genus *Conocephalus* of most writers.

NEOCONOCEPHALUS ROBUSTUS (Scudder).¹

Tappahannock, July 27 to September 6 (6 males, species common); Sharps, June 22 (1 juv.); Millenbeck, August 8 (1 male, 1 female, 1 juv.).

Charlottesville, June 28 to July 8 (nymphs), July 16 to August 12 (frequent); Crozet, August 1 (song heard).

Frequent on dry land or at the borders of tidal marshes, occurring on tall grasses and herbage in fields, pastures, and roadsides.

NEOCONOCEPHALUS ROBUSTUS CREPITANS (Scudder).

Tappahannock, July 23, 27 (3 males).

Associated with the preceding in similar habitats.

NEOCONOCEPHALUS PALUSTRIS (Blatchley).

Tappahannock, August 12 to October 2 (4 males, 11 females); Naylors, September 17 (1 female).

Common in tidal marsh on *Spartina cynosuroides*, less frequent on *Scirpus americanus*; also occurs on cattails and in moist depressions filled with succulent grasses at the head of gulleys.

NEOCONOCEPHALUS RETUSUS (Scudder).²

Churchland, September 15, November 4; Portsmouth, October 3; Deanes, September 26; Franklin, September 18; Tappahannock, August 21 (juv.), August 23 to October 2; Sharps, October 13.

Louisa, October 26; Charlottesville, September 10-13, 1914, September 3, 1915.

Usually frequent to common in the thick grasses of fields, pastures, meadows, and roadsides; occasional in or along the borders of tidal and other marshes.

NEOCONOCEPHALUS TRIOPS (Linnaeus).

Tappahannock, April 24, September 6 to October 2; Naylors, September 17; Sharps, May 4-8.

Charlottesville, May 11, 1914 (1 male).

Not uncommon in the dense stands of *Spartina cynosuroides* in tidal marshes, spreading to the surrounding thickets (*Baccharis*, *Myrica*, etc.), and in the spring also to the dry land, being found at that season in full song in trees, grasses, and shrubbery, as well as in the marshes.

HOMOROCORYPHUS MALIVOLANS (Scudder).

Tappahannock, July 13 to August 18, 1915 (29 males, 12 females).

Frequent, locally at least, in dense stands of *Spartina cynosuroides*

¹ Practically all the material included under this species appears to be intermediate between the typical race and the subspecies *crepitans*.

² In the writer's article on New Jersey Orthoptera, p. 522, the records there included under *triops* actually pertain to *retusus*. Rehn and Hebard by their recent revision have rendered a great service to field workers in clearing up the confusion in which this and several other related genera had previously been involved (Trans. Amer. Entom. Soc., vol. 40, 1915, pp. 365-413).

in tidal marshes; rarely occurring in briery thickets on nearby knolls. Observed ovipositing in *Spartina cynosuroides*. This, I understand, is the most northern record of the species.

ORCHELIUM¹ AGILE (De Geer).

Norfolk, September 17; Portsmouth, October 3; Churchland, September 15-16; Gilmerton, October 1; Deep Creek, October 1; Cape Henry, September 20; Franklin, November 5; Tappahannock, August 10-October 9; Naylor's, September 17; Sharps, October 13; Millenbeck, September 27; Irvington, September 26; Whitestone, September 26.

Fredericksburg, September 5 (1 male in *Andropogon* of upland field); Charlottesville, October 31, 1915 (1 male, wet, grassy spot at head of rivulet in open field).

Usually abundant in wet or moist areas generally, especially in the *Scirpus americanus* formation of tidal marshes and the marginal fringe of succulent grasses, but never occurring in true salt marsh (*Spartina glabra*); also common in cattail, sedgey and grassy bogs inland at the head of sluggish streams. Occasionally it spreads to the adjoining dry land, specimens having been taken in goose grass (*Eleusine indica*), crab grass, foxtail grass, and *Andropogon*. The species will doubtless be found to be better represented in the Piedmont section than the present records indicate.

ORCHELIUM GLABERRIMUM (Burmeister).²

Portsmouth, October 3; Churchland, September 15; Deanes, September 26; Gilmerton, October 1, November 6; Deep Creek, October 1; Cape Henry, September 20; Franklin, September 18, November 5.

Although I found this species quite frequent in suitable localities in southeastern Virginia, I could find no trace of it in the Rappahannock River section of tidewater Virginia. This seems strange in view of its occurrence in southern New Jersey.

In New Jersey *glaberrimum* appears to be restricted to the inland bogs (cedar swamps) of the Pine Barrens, but in the Norfolk region it is evidently more flexible in its habitat requirements. At Cape Henry, in addition to being common in the rank vegetation of dune hollows and ditches, it was not infrequent in the tall bunch grasses (*Andropogon*, *Panicum amarum*, etc.) on the surrounding dry sand dunes. Farther inland it appeared to prefer areas of stiff, but not always moist, soil, occurring in the rank plant growth of ditches and woodland borders and scrub. It evidently has a strong predilection for sylvan surroundings.

¹ The nomenclature here adopted in this and the following genus is that used by Rehn and Hebard in their recent revision (See Trans. Amer. Entom. Soc., vol. 41, 1915, pp. 11-83 and 155-224.)

² This name, used by most writers in the past for the long-winged phase of *vulgaris*, actually belongs, according to Rehn and Hebard, to the *O. erythrocephalum* of Davis, which therefore becomes a synonym. It was under the latter term that I included all my personal records of the present species in my list of New Jersey Orthoptera, the term *glaberrimum* there being mistakenly applied to a form which has since been described by Rehn and Hebard as a distinct species under the name *superbum*.

ORCHELIUM VULGARE Harris.

Churchland, September 15 to October 4, November 4; Deanes, September 26; Gilmerton, October 1; Deep Creek, October 1; Cape Henry, September 20; Franklin, September 18, November 5; Tappahannock, August 16–October 11; Wares Wharf, October 3; Naylor's, September 17; Sharps, October 13; Ottoman, August 8, September 27; Irvington, September 26.

Fredericksburg, September 5; Charlottesville, October 16, 1914.

Monterey, August 17–30; Hot Springs, September 6.

Common at all the localities listed, except Charlottesville, where only a relatively small number have so far been observed.

This is the least specialized representative of the genus in its habitat selections. It frequents tall grasses, weeds, and bushes on dry land, or land that may be damp or temporarily wet, but largely avoids areas of standing water or saturated soil such as are found in stagnant bogs and tidal marshes, being replaced in such places in the Coastal Plain by *agile*. In the mountain section, however, it was common in wet meadows, but these are occupied by a more varied herbaceous vegetation than that of the bogs and tidal marshes of the Coastal Plain. Typically *vulgare* occurs in open situations, but in certain sections of tidewater Virginia (Irvington, Ottoman) I found it common on *Andropogon* in woodland clearings, and in the mountains in the dry, scrubby undergrowth of wooded slopes.

ORCHELIUM LATICAUDA Redtenbacher.

Tappahannock, August 13 to October 2 (19 males, 3 females); Wares Wharf, October 3 (2 males); Sharps, October 13 (1 male); Ottoman, August 8 (1 male).

Occasional in a variety of situations, occurring regularly in tidal and fresh-water marshes and pond borders, but the males, at least, spreading in small numbers to upland districts where the species was taken in a field of dense millet and in a thick growth of ragweed bordering the fence of a town lot. In the tidal marshes it was found in *Spartina cynosuroides* and in the marginal fringe of switch grasses. In fresh water bogs it was taken on various grasses, cattails, sedges, and bushes (e. g. *alder*). Unlike most members of the genus it appears to have a strong preference for woodland habitats.

ORCHELIUM MINOR Bruner.

Tappahannock, September 19–October 11, (11 males); Sharps, October 13, (Note); Millenbeck (note), September 27; Irvington, September 26 (1 female).

Occasional in pine trees (*P. taeda, virginiana, echinata*); the single female was captured in the blueberry undergrowth of pine woods.

ORCHELIUM CONCINNUM Scudder.¹

Portsmouth, October 3; Churchland, August 8-9, November 4; Cape Henry, September 20; Tappahannock, July 24 to September 7; Naylor's, September 17; Sharps, October 13.

Abundant in the *Scirpus americanus* formations of tidal marshes, less common in the associated *Spartina cynosuroides* and occasionally found in *Spartina glabra* (Sharps), but not typical of the latter, which it almost entirely avoids. At Tappahannock this species, although abundant in early and middle August, became quite scarce by early September, at which time it had been replaced as the dominant form of the tidal marshes by *agile*; on the other hand, it was found in abundance on the opposite side of the Rappahannock at Naylor's as late as September 17, but at this place *agile* was relatively scarce. Can it be that these two species are competitors and that *agile* after its advent gradually eliminates its rival?

ORCHELIUM FIDICINUM Rehn and Hebard.

Portsmouth, October 3 (1 female); Millenbeck, August 8, September 27; Whitestone, September 26.

Locally abundant in salt marshes, a characteristic denizen of the true salt marsh grass, *Spartina glabra*. At Whitestone this species was very abundant.

ORCHELIUM SUPERBUM Rehn and Hebard.

Tappahannock, July 27-28, 1915 (4 males).

This recently described species was found on *Scirpus americanus* in tidal marshes. Two of the specimens differ from the type in having the outer genicular lobes of the caudal femora bispinose instead of unispinose.

CONOCEPHALUS ² FASCIATUS (De Geer).

Churchland, August 8-9, September 15-16, November 4, 1914, July 11, 1915; Norfolk, July 11; Deep Creek, October 1; Deanes, September 26; Franklin, September 18, November 5; Tappahannock, June 17 to October 24; Naylor's, September 17; Sharps, June 22, October 13; Ottoman, August 8, September 27; Millenbeck, September 27; Irvington, September 26.

Fredericksburg, September 5; Charlottesville, June 15 to September 10.

Jarman Gap, August 1.

Monterey, August 16-31; Meadowdale, August 19; Trimble, August 15; Bolar, August 15.

A highly adaptable species, occurring abundantly in a variety of habitats in the Coastal Plain; more local and largely restricted to

¹ Called *O. herbaceum* in my List of New Jersey Orthoptera, p. 527.

² = Genus *Xiphidium* of most authors.

humid areas in the Piedmont and Appalachian sections, though still quite common, but in the latter surpassed by *C. brevipennis*. Occurs in open grassy fields and pastures, frequenting more especially the tenderer vegetation of farm lands (e. g., timothy, red-top, goose grass, Bermuda grass, clover) and moist or wet places generally, including tidal marshes (*Scirpus americanus*, *Distichlis spicata*), but not true salt marsh. Largely avoids wooded locations. May be two-brooded in Virginia.

CONOCEPHALUS BREVIPENNIS (Scudder).

Norfolk, September 17; Portsmouth, October 3; Churchland, September 15–16, November 4; Deanes, September 26; Gilmerton, October 1; Deep Creek, October 1; Virginia Beach, September 20; Franklin, September 18, November, 5; Tappahannock, August 18 to September 22; Naylor's, September 17.

Charlottesville, August 11, 1914 (1 male, 1 female).

Monterey, August 16–31; Meadowdale, August 19; Trimble, August 15, September 3; Bolar, August 15; Hot Springs, September 5–6.

Abundant throughout in the Appalachian localities, frequenting the pastures and meadows of the intermontane valleys and spreading into the open deciduous woods of the mountain summits, where it was not infrequent in the relatively dry grassy or shrubby undergrowth; its preference, however, is for moist or somewhat humid locations. In the Piedmont section and Coastal Plain this species appears to be scarce or at most only locally frequent, being confined largely to low humid areas (marshes, "branches," ditches, drains, springheads, etc.) or the denser undergrowth of woods. It evidently never occurs in tidal marshes. In the Rappahannock River section it appeared to be quite exceptional, but was of more regular and frequent occurrence in the region around Norfolk.

CONOCEPHALUS NEMORALIS (Scudder).

Charlottesville, October 10, 1914 (1 female), October 31, 1915 (2 males, Carter Mountain).

The exact distribution of this species in the region east of the Central States is still uncertain. All the available records are from localities along the front of the Appalachians. Besides the locality here given, the species is also known in Virginia from Luray, but I do not know of any records from the mountain section, despite the rather careful search I made for it while in that section.

CONOCEPHALUS STRICTUS (Scudder).

Norfolk, September 17; Portsmouth, October 3; Churchland, August 8 (juv.), September 15; Deanes, September 26; Gilmerton, October 1; Deep Creek, October 1; Cape Henry, September 20; Franklin, September 18; Tappahannock, August 13–October 2; Wares Wharf, October 3.

Fredericksburg, September 5; Louisa, October 26 (1 male); Charlottesville, September 10–October 31, 1914.

Monterey, August 22 (adults, nymphs), August 31; Bolar, September 3; Hot Springs, September 7.

Occasional or moderately frequent in open, undisturbed, dry grasslands, especially partial to *Andropogon*, but taken also in *Danthonia*.

CONOCEPHALUS STICTOMERUS Rehn and Hebard.

Churchland, August 8 (1 female),¹ September 15 (1 female); Tappahannock, July 31–October 2 (18 males, 9 females, 4 juv.).

Occasional in tidal marshes, especially in the tall reeds, *Spartina cynosuroides*, upon the spikelets of which it was observed feeding; less frequent in *Scirpus americanus*. Apparently active only at night.

CONOCEPHALUS NIGROPLEUROIDES (Fox).

Churchland, September 15 to October 1.

Occasional in tall *Spartina glabra* fringing small tidal creek. Not observed in the salt marshes of the lower Rappahannock River.

CONOCEPHALUS SPARTINAE (Fox).

Portsmouth, October 3; Churchland, September 15 to October 1, 1914; July 11, 1915 (1 female); Tappahannock, July 18 to September 7; Wares Wharf, October 3; Sharps, October 13; Millenbeck, August 8, September 27; Whitestone, September 26.

Usually common in true salt marshes, frequenting *Spartina glabra* and occasional in tidal marshes beyond the influence of salt water (Tappahannock), occurring in the latter on *Scirpus americanus* and *Spartina cynosuroides*.

CONOCEPHALUS SALTANS (Seudder).

Portsmouth, October 3; Churchland, September 16; Deanes, September 26; Gilmerton, November 6; Franklin, September 18; Tappahannock, August 21 (juv.), September 9 to October 11; Dunnsville, October 3.

Charlottesville, September 10 to October 31, 1914.

Occasional to frequent in coarse, dry grasses (*Andropogon*) usually in the vicinity of wooded areas.

ATLANTICUS TESTACEUS (Seudder).²

Charlottesville, March 27–May 25 (nymphs), June 23 to July 16, 1914.

Occasional in dry, open woodland or wooded borders, frequenting low shrubbery.

¹ This specimen is atypical, having the ovipositor considerably longer than in typical examples. See measurements in the recent revision of the genus by Rehn and Hebard.

² = *A. pachymerus* of authors. Mr. Rehn kindly determined all my examples of this genus collected in 1914.

ATLANTICUS AMERICANUS (Saussure).¹

Virginia Beach, September 20 (1 male); Franklin, September 18 (1 female); Tappahannock, September 22 (1 male, 1 female), October 11 (1 female).

Found in *Andropogon* scrub at margin of woods and in the undergrowth of pine woods.

ATLANTICUS DAVISI Rehn and Hebard.

Monterey, August 20 (1 female), September 1 (1 female); Hot Springs, September 6 (1 male).

Taken in grassy and shubby undergrowth of dry mountain woods.

CAMPTONOTUS CAROLINENSIS (Gerstaecker).

Tappahannock, July 28 (1 male).

Family GRYLLIDAE.

GRYLLUS ASSIMILIS Fabricius.

Norfolk, September 17; Churchland, September 15 to October 4, November 4-6; Gilmerton, October 1; Franklin, September 18; Tappahannock, April 24 to October 24.

Charlottesville, July 8 (1 female).

Hot Springs, September 6 (1 female).

Common in grassy tangles and underbrush of all kinds in fields, pastures, and borders of marshes.

ANUROGRYLLUS MUTICUS. ²

Tappahannock, June 7 to July 25.

Charlottesville, May 26 to June 3.

Frequent in fields and pastures and along fence rows. Nocturnal in habits, singing at or close to the mouth of its burrow.

MIOGRYLLUS VERTICALIS (Serville). ³

Tappahannock, June 28 to July 18 (2 males, 1 female).

Taken in short, bright green, tender grass growing on damp ground of sun-lit path in low woods.

NEMOBIUS FASCIATUS (De Geer).

Norfolk, September 17; Franklin, September 18; Tappahannock, August 21 to October 9.

Charlottesville, June 27-July 31 (nymphs).

Jarman Gap, July 30 (nymphs).

Monterey, August 16 to September 1; Meadowdale, August 19; Bolar, September 3; Hot Springs, September 6-7.

Abundant in grassy tangles and sod land generally, especially in damp spots. Ubiquitous in the mountainous section, more local or sporadic in the Piedmont region and Coastal Plain.

¹ = *A. dorsalis* of authors.

² Mr. Hebard kindly examined my 1914 specimens and referred them to this species with query.

³ Determined by Mr. Hebard. = *M. saussurei* of authors.

NEMOBIUS MACULATUS Blatchley.¹

Tappahannock, September 22 (1 female in tender grass of damp spot on path in deciduous woods).

NEMOBIUS CUBENSIS Saussure.

Tappahannock, September 6 (1 female on road through tidal marsh close to dense formation of *Spartina cynosuroides*).

OECANTHUS NIGRICORNIS Walker.

Monterey, August 17 to September 1 (1 adult).

OECANTHUS LATIPENNIS Riley.

Tappahannock, November 12, 1914 (1 female); August 12 (2 juv.), 21 to September 9, 1915 (4 females). (Old stubble field, roadside thickets.)

Hot Springs, September 6 (three adults, dry open woods of mountain summit).

OECANTHUS ANGUSTIPENNIS Fitch.

Charlottesville, July 14-17 (on oak in open grove).

OECANTHUS QUADRIPIUNCTATUS Bent.

Deep Creek, October 1 (1 female); Virginia Beach, September 20 (1 female); Cape Henry, September 20; Tappahannock, July 9 to September 19.

Charlottesville, June 16 (nymphs), July 3-14 (adults, nymphs).

Common on weeds and shrubbery in fields, open woodland and borders of marshes.

ANAXIPHA EXIGUA (Say).

Tappahannock, September 9 (1 female on *Scirpus americanus* in tidal marsh).

Charlottesville, July 14 (1 juv.).

APITHES AGITATOR Uhler.

Norfolk region (exact locality not certain), September 15 to October 3 (1 male, 1 female); Tappahannock, September 9 to October 2 (2 females).

Occurs in thickets and low brush of roadsides and field borders.

OROCHARIS SALTATOR Uhler.

Franklin, September 18 (1 female, undergrowth of pine woods).

¹ Determinations in this genus by Mr. Hebard.